



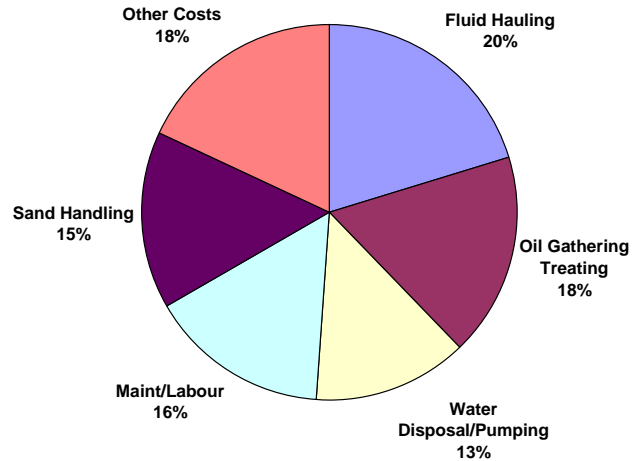
**PTAC Knowledge Centre
Upstream Oil and Gas Energy Efficiency**

Conventional Heavy Oil = Minimize Fuel Inputs and Venting

1. Quick Facts:

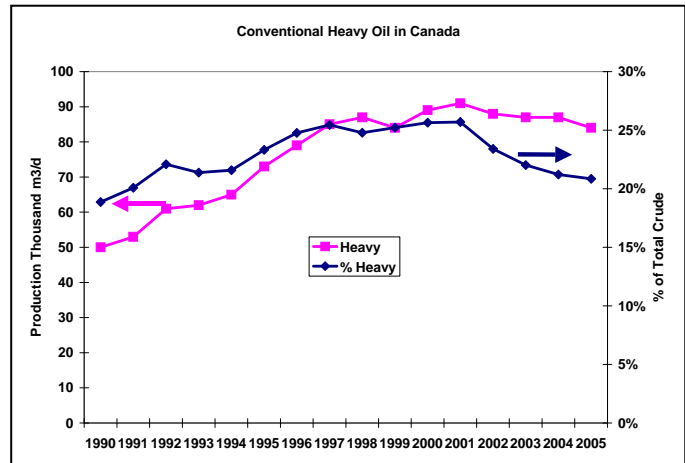
- Total WCSB CHO Production = 30 million m³/yr. Oil normally discounted 25% from light oil prices.
- Sample OpCost = \$38/m³ oil
- Energy % of OpCost = 40%
- Product Energy Intensity (PEI) = 1.2 GJ/m³OE (not including trucking!)
- Casing Gas Vented/m³ of oil = 37 m³/m³
- Over \$200M worth of produced gas vented in 2003 @ \$6/GJ
- Energy Values:
 - a. Electrical Power @ \$20/GJ
 - b. Propane Fuel @ \$20/GJ
 - c. Gasoline/Diesel @ \$20/GJ
 - d. Natural Gas Purchased @ \$8/GJ
 - e. On-site Gas Produced @ \$6/GJ

CHO Operating Cost Distribution



2. Key General Documents on Conventional Heavy Oil and Energy Issues

- a. **“Heavy Oil Vent Gas Mitigation Options”** New Paradigm 2000. This document discusses options to reduce methane venting from heavy oil wells by using vent gas to displace outside energy, generate power, provide energy for small scale hot water flooding, or gas for sale. This document is available on the PTAC web site at: <http://www.ptac.org/links/EnergyEfficiencyKC/eekc0502.pdf>
- b. **“Course Notes – Petroleum Society of CIM, Lloydminster, Section Short Course – Introduction to Cold Heavy Oil Production (CHOP)”** by Kirby Hayes, Bob Motram and Ron Sawatzky.
- c. **“CHO Vent Gas Quantification Standards”** – Analysis of conventional heavy oil vent data has shown that consistent Gas/Oil Ratios are achievable if vent gas is measured in a consistent manner. A Joint Industry Project to develop vent



quantification standards was completed in 2004. This document is available on the PTAC web site at: <http://www.ptac.org/links/EnergyEfficiencyKC/eekc0501.pdf>

d. **AEUB Directive 60 Flaring and Venting, November, 2006** – Lays out requirements to reduce flaring and venting in Alberta. <http://www.eub.ca/docs/documents/directives/Directive060.pdf>

3. Information on New Energy Options for Conventional Heavy Oil

- a. **Hot Water Floods for Conventional Heavy Oil** – In many operating areas surplus casing vent gas could be collected at low pressure and used to heat produced water for a low cost thermal operation. Often the only additional equipment needed is a standard line heater and water line from a water disposal facility to an injection well into the formation. A key is the use of the “free” vent gas.
- b. **Heavy Oil Pipelining to Avoid Trucking or Improvements to Trucking Efficiency** – Trucking costs severely limit heavy oil production as produced water volumes increase. Pipelines may soon replace trucking, but there are also proven technologies to reduce the costs of operating a truck fleet and reducing the total kilometers driven. The Office of Energy Efficiency’s Fleetsmart program offers ideas to reduce trucking costs <http://oee.nrcan.gc.ca/transportation/fleetsmart.cfm?attr=0> PTAC has a Heavy Oil Transportation Committee addressing trucking and pipeline issues.
- c. **“Conventional Heavy Oil R&D Needs Including GHG Intensity Reduction”** NRCan/PTAC Sept 2005 - <http://www.ptac.org/cho/dl/chop0501fr.pdf>
- d. **“Expanding Heavy Oil and Bitumen Resources”** NRCan/PTAC May, 2006 - <http://www.ptac.org/osd/dl/osdp0601r.pdf>

4. Financial Support for Change

- a. Federal
 - i. Financial Assistance for Industry <http://oee.nrcan.gc.ca/industrial/financial-assistance.cfm?attr=24>.
 - ii. Fleetsmart Program – Includes rebates for fuel efficient devices for trucks and driver training programs: <http://oee.nrcan.gc.ca/transportation/fleetsmart.cfm?attr=0>

5. Key Reports on Volumes, Trends and Environmental Impacts

- a. **“Upstream Petroleum Industry Flaring and Venting Report - Industry Performance for Year ending December 31, 2005”**, AEUB, ST 2005-60B, May 2005, shows vent volumes by company. http://www.eub.ca/docs/products/STs/st60b_current.pdf